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By-Fleury, Bernard J., Jr.; Cappelluzzo, Emma M.

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This study aimed to ascertain the relationship between entrance requirements for graduate level training programs in educational research and the trainee's success in completing or gaining reappointment to the program. An extensive review of the literature is followed by presentation of data gathered from 525 questionnaires representing 60 of the 85 programs in this field. 5 criteria for admission were included: 1) standardized test scores; 2) previous academic background (major and minor fields of study; 3) previous grade-point averages; 4) professional educational experience and/or certification; and 5) age at date of admission. It was concluded that the entrance requirement profiles were not effective predictors of success of program completion for the group of research trainees included in this study. The entrance requirement variables effectively predicted success only about 15 per cent of the time. Further research is suggested. This report is available upon request from Applied Educational Research Training Program, University of Massachusetts, Amherst, Mass. (DS)

EDUCATIONAL RESEARCH TRAINING PROGRAMS: REQUIREMENTS FOR ADMISSION

Bernard J. Fleury, Jr.

Emma M. Cappelluzzo

This report is available upon request to interested Research Trainers as a service function of the University of Massachusetts Applied Educational Research Training Program.

Research Training Program

School of Education

University of Massachusetts

Dr. William C. Wolf, Jr.

Director

The Authors:

Dr. Bernard J. Fleury, Jr., Associate Director of the Applied Educational Research Training Program, University of Massachusetts, School of Education, 1966-68, and presently Assistant Professor of Education -- Philosophical Foundations, Westfield State College, Westfield, Massachusetts.

Dr. Emma M. Cappelluzzo, Associate Professor of Education, Sociological Foundations, and member of the staff of the Applied Educational Research Training Program, School of Education, University of Massachusetts, Amherst, Massachusetts.

Consultants:

Drs. George T. Farley and Edward Pepyne, Research Fellows, Applied Educational Research Training Program, University of Massachusetts, 1966-1968.

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Educational Research Training Programs: Requirements for Admission

Purpose

The purpose of this study was to ascertain the relationship between certain entrance requirements for graduate level educational research training programs and the success of the trainee in satisfactorily completing all requirements in a one or two year program, or gaining reappointment to second or third years in a training program.

Since the training programs studied had completed the second year at the time the data was gathered, it was not possible to assess the relationship between entrance requirements and successful completion of all requirements in the three year programs.

Sample

The population consisted of all graduate level educational research trainees who were admitted to the Title IV USOE Research Training Programs as of September 1, 1966, or who have been admitted since that date, and have actually registered for courses and begun the program.

Procedures

A questionnaire was designed to gather the following data:

1. Standardized tests and test scores used as criteria for admission;
2. Undergraduate and graduate grade point averages;
3. Academic background (major and minor fields of undergraduate and graduate study);
4. Professional educational experience and/or certification, including the number of years of such experience that trainees had at date of admission, and
5. Age at date of admission.

RELATED RESEARCH

Review of Descriptive Research Studies

In comparison with the number of research studies that have been completed in other fields of study in education such as reading, history, etc., the number of studies on the training of educational researchers is small indeed.

There are only four descriptive studies on educational research training which have been completed to date (May 1968). A fifth descriptive study was still in progress at the time of this writing with a "preliminary projections" report being the only information presently available on this study.

Three of the completed studies present evidence that indicates a relationship between certain entrance requirements for graduate level educational research training programs and the

1. quantity of trained researchers produced by these programs, and

2. the research productivity of the doctoral level personnel graduated in the years of 1954 and 1964.

Two of the completed studies have attracted more attention on the part of trainers of educational researchers than have the others. These studies are:

1. The Organization of Educational Research, by Sam Sieber and Paul Lazarfeld, (1966), and

2. Training for Educational Research, by Buswell, McConnell, Heiss and Knoell, (1966).

There are two principal reasons why the aforementioned descriptive studies have received such widespread attention:

1. The principal authors and their associates, among whom can be found such well known names as David E. Clark, L. J. Cronbach, N. A. Fattu, A. W. Foshay, N. L. Gage, Daniel Griffiths, Julian Stanley, Sloan Wayland, Roald

Campbell, E. F. Lindquist, and Ralph W. Tyler are among the most eminent research training authorities in the field.

2. Taken together these two studies present the only comprehensive view of the organization of educational research and researcher training as they existed in the United States just prior to the activation of the USOE Training Programs in the fall of 1966.

The Sieber and Lazarfeld study involved the 107 graduate schools or education departments which awarded the Doctorate in 1963-64. The problem according to Sieber and Lazarsfeld was

> to gain information about an institutional realm whose imputs are not recorded in any systematic way, and to relate this information to various kinds of intellectual outcomes. More concretely, it was a matter of measuring the numerous social conditions which might conceivably impinge on the production of research and of researchers by graduate schools of education. (4, p.1)

This study was concerned with factors that influenced the production of researchers, that is, men who entered positions where research was a primary responsibility.

Buswell and McConnell's study involved 818 persons, or 59.7% of those who received the Ph.D. or Ed.D. degree in Education in 1954, and 1750 persons, or 77.4% of those who received the Ph.D. or Ed.D. degree in Education in 1964. As stated in the opening paragraph of Chapter one,

> The problem of this study is to find means for improving educational research by attempting to identify factors that lead to research productivity. Some of these factors reside in the training institutions, their graduate programs, their intellectual climate, and the characteristics of their students and faculty, while other factors reside in the patterns of available professional positions and in the special programs, centers and institutes within which much educational research is done....

> The principal purpose of (the questionnaire) portion of the study was to discover whether persons who had published research during the ten year period differed significantly from persons who had not published research, in respect to the characteristics covered by the questionnaire. It was therefore, necessary to arrive at some basis for differentiating the research group from the no-research group. This was done on the basis of the returns on question sixty four which asked for a listing year by year of the research that had been published by the person returning the questionnaire....
>
> The following criteria were reviewed by the research staff and were accepted as guidelines for classifying the reference listed in the questionnaire returns:
>
> 1. The research must be published. Typewritten papers and mimeographed reports were not included.
> 2. References in local publications dealing with matters of purely local concern were excluded.
> 3. In general, book references were excluded, although if a portion of the book contained a primary report of a research study it was listed.
> 4. Reviews of research or of professional books were excluded.
> 5. Studies of a philosophical or logical nature were accepted if they were published in a reputable journal in that area.
>
> Most of the research publications included were empirical studies containing substantive evidence. The primary aim was to distinguish those publications which were serious systematic studies or problems based on the collection of evidence, from publications which talked about a problem but were nothing more than the opinion of the author supported what was said. (1)

The third completed study which was less comprehensive than the first two studies, The Development of Professional Personnel in Educational Research, recently completed (September 1966) by Nancy H. Millikan under the sponsorship

of Sloan Wayland and Paul Lazarsfeld of Columbia University, had two objectives:

1. Identification of conditions and structural characteristics of the graduate institution of education and of any sub-units of the parent organization that may relate to production of researchers by each of the two institutional settings....

2. Identification of individual characteristics that may relate to patterns for potential commitment to research by recent doctoral recipients in education. (3, pp. 1-3)

Millikan had two major sources for her data:

1. The data collected by Sieber and Lazarsfeld, Buswell and McConnell, in the studies cited, as well as data collected by Brown using a questionnaire survey of behavioral scientists in departments of seventy seven of the 107 universities represented in the Sieber-Lazarsfeld study.

2. Data collected by Millikan herself from:

   a. Content analysis of the 1963-65 catalogues of 110 graduate institutions of education that administer the doctoral degree.

   b. Some case studies of a few selected research organizations.

   c. Interviews with twenty individuals: professors who taught research courses in graduate institutions of education and in behavioral science departments outside the department of education; recent doctoral students in departments of education and sociology.

   (3, p. 4)

Pertinent Conclusions of Descriptive Research Studies Relevant to Recruitment and Entrance Requirements for Graduate Level Educational Research Training Programs

Professional Educational Experience

Millikan (3), Buswell (1), and Sieber and Lazarsfeld (4), probe the relationship between the requirement of professional educational experience for trainees and whether the trainees subsequently enter positions where research is a primary responsibility, and become productive researchers. Millikan (3) asserts that individuals who have spent from one to five years in teaching or other school experience are potential recruits for research training. But, she goes on to say that evidence shows that individuals who spend at least six years in teaching or other school experience are not potential recruits for research.

Buswell's (1) conclusions support those of Millikan. He indicates that the number of years of teaching experience prior to the doctor's degree is negatively related to research production in the ten years following the degree among Ph.D.'s and Ed.D.'s who received their degrees in 1954 and 1964. 53.3% of the Ph.D. (1954) and 36.5% of the Ed.D.'s (1954) who published research, had five or fewer years of teaching experience. Correspondingly 69.3% of the Ph.D.'s (1954) and 80.9% of the Ed.D.'s (1954) who did not publish research, had six or more years of teaching experience. The percentages for the 1964 graduates are similar. (1)

It is important to note that Buswell makes the point that the factors of age at the time of taking the doctor's degree, lateness of decision to go on for graduate work, and amount of professional experience prior to the doctor's degree, are all interrelated, but their relationship to research production is similar. Those with little or no teaching experience are also the younger graduate students. (1, p. 15)

Sieber and Lazarsfeld's conclusions are not related to the number of years of teaching experience but rather to whether any professional experience and/or

a teaching certificate should be required. Upon the basis of evidence gathered in their study (4), Sieber and Lazarsfeld claim that schools which require both professional experience and a teaching certificate are least productive of researchers. Schools requiring only a teaching certificate or neither a certificate nor experience are most productive.

In summary they conclude that the data gathered support the claim that the entrance requirement of professional experience reduces the production of researchers, especially in schools with more Ph.D. candidates. The effect of entrance requirements on the substance or quality of research carried out was not measured. (4)

The evidence presented by Buswell (1), Sieber and Lazarsfeld (4), and by Millikan (3) indicates that requiring professional educational experience and/or a teaching certificate is detrimental to the maximum effectiveness of research training programs in producing educational researchers who will enter positions where research is a primary responsibility and who will be productive therein. It is also apparent, that based on the findings of these three studies, teachers with more than five years experience are poor risks as educational researcher trainees. The chances that such trainees will complete their training, enter positions where research is the primary work, and be productive researchers, are much slimmer than they are for trainees with fewer than five years of teaching experience or no such experience at all.

Age

Two research studies, those of Buswell (1), and Millikan (3), present findings which state that prospective research trainees should be selected who will be thirty-two or younger at the completion of the Doctoral program. Buswell concludes that in terms of the research produced in the ten years following the

doctoral degree, it is clear that more of those who got the degree at age thirty-two or under are productive than those who got their degrees at age forty or older.

Level of Student Talent

Of the five descriptive research studies cited in this chapter, that of Sieber and Lazarsfeld is the only study which specifically mentions the "level of student talent" as an important factor to consider when establishing recruitment policies for research training programs.

> To explore the institutional arrangements which might affect the output of researchers, we have suggested a framework consisting of (1) recruitment policies bearing on the level of student talent, (2) the research climate of the school, and (3) provisions which exist for preparing researchers....
>
> If we were disposed to select the most important set of factors, we would designate recruitment policies affecting the level of student talent. (4, p. 337)

Trainers of researchers seem to accept scores on a number of different standardized tests as indicators of the level of student talent. The Miller Analogies Test and the Graduate Record Examination lead the field in terms of frequency of use with 49.4% (42/85) of the USOE Training Programs requiring or preferring the Miller Analogies Test and 76.5% (65/85) the Graduate Record Examination. The remainder of the USOE Programs either specify no particular test or are scattered among a number of tests such as Dopp. Math Reasoning, S.C.A.T., National Teachers Exam, and Minn. Multiph., Personality Inventory.

Grade point averages are the second standard by which USOE Training Programs attempt to gauge levels of quality in applicants for traineeships. Nearly all the Programs mention "scholarship" as one criterion for admission but less than half, 48.2% (41/85) specify (in their proposals to the USOE) set undergraduate or graduate grade point averages as acceptable minimums. Of those

Programs specifying a set minimum undergraduate grade point average, 34.1% (29/85) list 3.0 (four point scale), while 5.9% (5/85) list the same 3.0 minimum for graduate grade point averages.

Academic Background

Buswell presents evidence which he claims, indicates that the undergraduate major in psychology provides "something" that is conducive to doing research following a doctor's degree. He relates that for those taking their Ph.D., the percent of undergraduate majors in psychology in the research (did publish research) group was 15.0 as compared with 1.3 for the no-research group. For the Ed.D.'s the corresponding percentages were 7.3 and 1.3.

Buswell's findings with regard to the relationship between an undergraduate major in psychology and research productivity, while both interesting and informative, are far from conclusive, as he himself would undoubtedly admit. These findings may, nevertheless, serve as "likely" indicators with regard to the value of an undergraduate major in psychology in relationship to future research productivity.

There is a wide range of practice among the USOE Training Programs with regard to the types of academic backgrounds required or preferred in prospective research trainees, with a majority (47/85) of the Programs not specifying any particular major though all require a Bachelor's degree from an accredited four year college or university and seventeen require or prefer a Master's degree in addition to the Bachelor's.

The data just reviewed regarding Standardized test score, grade point average, and academic background entrance requirements for the 85 USOE Training Programs, was gathered by means of an examination of the original proposals of these programs, which were submitted to the USOE in 1966 for initial approval and fund-

ing. Since it may be that, (1) some of the programs did not include specific references to test, grade point average, and academic background entrance requirements in their original proposals, but still used these items to help gauge the level of talent of prospective trainees, and (2) that when applying for second year funding, changes were made by the trainers in these three entrance requirements, it seemed feasible to include on the questionnaire to be used in this study a three part question which seeks current information on the status of test, grade point average, and academic background entrance requirements for the USOE Programs.

Summary

There is a paucity of research on research training. The published research studies are descriptive of practices of schools of education which relate to the production of educational researchers and to the research productivity of such personnel. In fact, the presently existing studies do not deal specifically with the practices o_ research training programs as such but rather with Ph.D. and Ed.D. programs in general, as offered by major U. S. universities and colleges just prior to the activation of the Title IV USOE Educational Research Training Programs in September, 1966.

This study was therefore in an area where to the best of the investigators' knowledge, has not been previously researched with reference to the presently existing graduate level USOE Educational Research Training Programs.

If certain entrance requirements do affect (1) the quantitative production of trained educational researchers who will enter positions where research is a primary responsibility, and (2) the research productivity of these trained researchers, then it would seem that a study which sheds light on the relationship between entrance requirements and a program's production of researchers

will be of significant value to the present and future designers of educational research training programs.

Analysis of Data

Data regarding one or more of the five entrance requirements studied, was received on 525 research trainees representing sixty of the eighty five Graduate Educational Research Training Programs to which questionnaires were originally mailed. The question immediately arises as to how representative are the sixty programs with regard to the total number of eighty five programs. Are the entrance requirements of the sixty programs from which returns were received, representative of the entrance requirements of the eighty five programs?

In a study recently completed by Fleury (2) he reports the following information with regard to the entrance requirements of the eighty five USOE funded graduate level educational research training programs:

1. Types of Standardized Tests

   a. 49.4% required or preferred the Miller Analogies Test. 50% of the programs submitting returns on the present study also require or prefer the Miller Analogies Test.

   b. 76.5% required or preferred the Graduate Record Exam. 67% of the programs submitting returns on the present study also require or prefer the Graduate Record Exam.

2. Grade Point Averages

   48.2% specified set undergraduate or graduate grade point averages. 78.3% of the programs submitting returns on the present study also require or prefer set grade point averages.

3. Academic Background

   44.7% required or preferred specific academic major. 60% of the programs submitting returns on the present study also require or prefer a specific academic major.

4. Professional Educational Experience and/or Certification

> 55.3% did not mention this requirement, while 44.7% required or preferred some type of professional educational experience and/or certification. 51.6% of the programs submitting returns on the present study also require or prefer some type of professional educational experience and/or certification.

5. Age at Date of Admission

> 35.3% specified set maximum age at date of admittance. 33% of the programs submitting returns on the present study also specify a set maximum age at date of admittance.

The difference in the percentages of the 85 programs requiring certain entrance requirements and the percentages of the sixty of these programs which responded to the present study are significant (10% or greater) with regard to two of the five entrance requirements:

1. Grade Point Averages

2. Academic Background

A substantially greater percentage of the 60 programs submitting returns in the present study indicate specific requirements for Grade Point Averages and Academic Background than was the case with the original requirements of the 85 programs reported in Fleury's study. A number of factors may account for this discrepancy:

1. the sixty programs submitting returns in the present study are not representative of the eighty-five programs.

2. the original requirements of many of the eighty-five programs have been amended since they submitted their original proposals from which the data for Fleury's study (2) was taken.

3. requirements which were vague (and perhaps missed in Fleury's study) have now been clearly stated and thus recorded in the present study.

After comparing the requirements of a number of the sixty programs with

requirements listed in original proposals for Federal funding, it was found that their requirements had, over the two year period, been made more explicit in some cases and amended in others. It can be assumed that the 60 programs submitting returns in the present study are representative of the 85 Federally funded educational research training programs originally studied by Fleury (2).

ANOVA's were compiled with regard to individual trainee profiles on two of the program entrance requirements, standardized tests (MAT and GRE) and grade point averages, to determine whether there were any siginificant differences in means between the students in one year, two year and three year programs. Since the one year programs are either non degree or Master's programs; the two year programs, Master's, sixth year level, or Doctoral programs with Educational Research as a second major, and the three year programs exclusively Doctoral programs; it seemed likely that the standardized test scores and grade point averages of trainees should be in a direct and positive relationship to the length of the program, the highest scores being found in the three year programs. However, with regard to the Graduate Record Exam, Chart 1 shows this does not appear to be the case. The ANOVA indicates no significant difference in means between the three groups at either the .01 or .05 levels of significance.

When the ANOVA on Miller Analogies Test scores is examined, a similar result is noted. As Chart 2 indicates, there appears to be no significant difference in means between the three groups at the .01 level of significance, though there may be a significant difference in means at the .05 level of significance.

The results of the ANOVA with regard to grade point averages are similar to those for standardized test scores. There appears to be no significant differences in means between the three groups at either the .01 or .05 levels.

Charts 4, 6, and 8 record the requirements or preferences of the sixty programs with regard to Academic Major, Educational Experience and/or Certification,

CHART 1

Graduate Record Examination:
Required Scores on Verbal Section

Treatment Group	1 (year)	2 (years)	3 (years)
Sample size	20	10	250
Mean	547.00	592.00	591.53
Standard Deviation	82.08	91.51	99.90
Z	6.66	6.47	5.92

Analyses of Variance

	Sum of Squares	DF	Mean Square	F ratio	Fe .01	Fe .05
Between groups	36860.8668	2	18430.4334	1.8991	4.60	2.99
Within groups	2688202.2437	277	9704.7012			
Total	2725063.1105	279				

CHART 2

Miller Analogies Test
Required Scores

Treatment Group	1 (year)	2 (years)	3 (years)
Sample size	13	64	183
Mean	60.769	63.281	67.459
Standard deviation	16.684	13.878	13.991
Z	3.642	4.560	4.822

Analyses of Variance

	Sum of Squares	DF	Mean Square	F ratio	Fe .01	Fe .05
Between groups	1215.9083	2	607.9542	3.0577	4.60	2.99
Within groups	51098.6878	257	198.8276			
Total	52314.5962	259				

CHART 3

Grade Point Averages
Required Undergraduate

Treatment Group	1 (year)	2 (years)	3 (years)
Sample size	31	52	352
Mean	3.0755	2.9358	3.0906
Standard deviation	.4011	.4289	.4414
Z	7.6672	6.8456	7.0021

Analyses of Variance

	Sum of Squares	DF	Mean Square	F ratio	Fe .01	Fe .05
Between groups	1.0864	2	.5432	2.8413	4.60	2.99
Within groups	82.5857	432	.1912			
Total	83.6721	434				

CHART 4

Academic Major
Required or Preferred

Educational Administration	4
Educational Curriculum	12
Humanities	4
Psychology	12
Sociology	7
Social Sciences	9
Biological Sciences	8
Physical Sciences	9
Other	1
*	66 programs

* Actual number of programs represented is 36. Some programs list more than one academic major while 24/60 programs indicate no preferred or required academic major.

and Maximum Age at date of admission.

Several interesting factors become apparent when the trainee profile charts are examined. On Chart 5, "Trainee Profiles: Academic Majors", it is clear that three fourths of the trainees included in this study were not education majors at the undergraduate level. Psychology and the Physical Science majors make up nearly half of the trainees. When the graduate majors (masters or sixth year levels) are examined, it is evident that a decided switch has taken place More than half of the trainees reporting had majors in Education. Thus it appears that many trainees combine an undergraduate major in a discipline other than education with a graduate major in education, a combination that a number of research trainers deem desireable.

CHART 5

Trainee Profiles:
Academic Majors

	Undergraduate	Graduate
Educational Administration (including Ed. Res.)	0	72
Educational Guidance	1	29
Educational Curriculum (includes any labelled "Ed" only)	106	115
Humanities	71	26
Psychology	100	86
Sociology	27	14
Other Social Sciences	76	33
Biological Sciences	26	10
Physical Sciences	114	41
Other	1	2
Total number of trainees	522	428

CHART 6

Educational Experience and/or
Certification Required or Preferred

Elementary and/or Secondary Teaching Experience Required or Preferred	31
Other Professional Educational Experience Required or Preferred	17
Elementary and/or Secondary Teacher Certification Required or Preferred	13
Other Certification Required or Preferred	3
	*64 programs

* Actual number of programs represented is 31. Some programs while requiring or preferring educational experience of some sort, checked two or more of the four categories listed above. 29/60 programs failed to indicate any sort of professional educational experience and/or certification requirement or preference.

CHART 7

Trainee Profiles:
Educational Experience

Years	Teaching	Administrative	Other Educational Experience
20 +	1	1	1
15 +	7		
10 +	18	2	2
5 +	77	19	11
4	36	8	6
3	59	10	18
2	68	11	30
1	66	24	42
Total No. of trainees	323	75	110

The data presented on Chart 7 "Trainee Profiles: Educational Experience", indicates that the overwhelming majority of trainees had less than five years experience in education or no professional educational experience at all. As is indicated in the Related Research section of this study, this is a desireable characteristic with regard to the trainee successfully completing the research training program and subsequently entering a position where research is a primary responsibility.

Age at date of admission was the fifth entrance requirement concerning which data was gathered in the present study. Buswell (1) and Millikan (2) indicate that prospective trainees should be selected who will be thirty two or younger at the completion of the Doctoral program.

Given the factor of a back log of prospective research trainee talent which was awaiting some form of financial assistance to begin training, it is surprising that, as Chart 9 indicates, over sixty percent of the trainees were twenty nine years of age or under at date of admission. This implies that they would complete their training on or before the age of thirty two. Another large block of trainees is in the thirty to thirty five category. If this category is added to the under twenty nine group we find more than eighty percent of present trainers under the age of thirty five at date of admission which bodes well for educational research since these trainees will have a large portion of their working life still ahead of them upon completion of their training.

Entrance Requirements vs. Successful Completion of Research Training Programs

The main focus of this study was an attempt to determine the relationship between entrance requirements for graduate level educational research training programs and whether the trainee successfully completes the program. In other words, how predictive are the 5 most common entrance requirements, singularly

CHART 8

Maximum Age Required or Preferred
at Date of Admission

40 - 45	7
36 - 39	0
30 - 35	8
26 - 29	2
25 or less	3
	20 programs representing 1/3 of the 60 programs submitting returns.

CHART 9

Trainee Profiles:
Age at Date of Admission

56 +	1
50 - 55	3
46 - 49	5
40 - 45	31
36 - 39	39
30 - 35	109
26 - 29	131
20 - 25	193
Total number of trainees	512

or in combination with regard to the success of a trainee in completing a research training program.

In order to answer this question, a multiple regression problem was posed in which an attempt was made to derive a formula which would predict the extent of success for an individual candidate by examining his entrance requirements' profile. It should be noted that academic background was not included in the multiple regression due to the extreme difficulty of effective and meaningful categorization of "majors".

Chart 10 presents a Summary Table which indicates that even with the inclusion of all variables there is still approximately eighty five percent of the variation to be accounted for. In other words, the entrance requirement variables included in the multiple regression process, effectively predict success only about fifteen percent of the time! It seems fair to conclude that for the group of research trainees included in this study, their entrance requirement profiles were not effective predictors of the relative success of the trainees in completing the programs. It would be rash to conclude on the basis of this study alone that present entrance requirements need to be revised. However, on the basis of the evidence presented, the relationship between present entrance requirements and levels of success in completion of the programs by trainees, should be a fruitful area for further research.

CHART 10

Multiple Regression Summary Table

Step Number	Variable Entered	Removed	Multiple R	RSQ	Increase in RSQ	F Value to Enter or Remove	No. of Independent Variables Included
1	Experience Admin. 7		0.2366	0.0560	0.0560	3.8532	1
2	GPA - Graduate 5		0.3203	0.1026	0.0466	3.3260	2
3	Experience Other 8		0.3575	0.1278	0.0252	1.8207	3
4	Age Year 10		0.3762	0.1415	0.0137	0.9923	4
5	GRE - verbal 2		0.3858	0.1488	0.0073	0.5223	5
6	Experience Tchg. 6		0.3883	0.1508	0.0019	0.1372	6
7	GPA - Undergrad. 4		0.3907	0.1526	0.0018	0.1282	7
8	GRE - MT 3		0.3912	0.1530	0.0004	0.0268	8
9	Miller 1		0.3915	0.1533	0.0003	0.0198	9

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